California Interagency Working Group on Indoor Air Quality

Meeting Minutes

September 8, 1999

UC Irvine Center for Occupational and Environmental Health
Centerpointe, 19722 MacArthur Blvd., Irvine, CA

SPECIAL PRESENTATION

Mark Katchen, The Phylmar Group
"The Escalating Stages of IAQ Complaints and Responses"

AGENCY REPORTS ON CURRENT IAQ ACTIVITIES

American Lung Association of Los Angeles County (ALA-LAC)
California Air Resources Board / IAQ & Personal Exposure Assessment Program
California Department of Health Service / Environmental Health Investigations Branch
California Department of Health Service / Indoor Air Quality Section
California Department of Health Service / Occupational Health Branch
California Department of Health Service / Tobacco Control Section
California Department of Industrial Relations (Cal/OSHA)
Lawrence Berkeley National Laboratory / Indoor Environments Program
Office of Environmental Health Hazard Assessment / Indoor Air Risk Assessment Group
San Bernardino County Superintendent of Schools Office
Stanford University
U.S. EPA Region IX / Indoor Environment Team

WORKING GROUP COMMITTEES

Indoor Environmental Quality of Schools
Building Design and Operations

FUTURE MEETINGS

MEMBERS PRESENT/AFFILIATIONS PRESENT AT MEETING

SPECIAL PRESENTATION

Mark Katchen, The Phylmar Group (http://www.phylmar.com)

"The Escalating Stages of IAQ Complaints and Responses"

Five Stages of Indoor Air Quality Progression

1. Trigger
- Event
- Odor
- Person
- Symptoms

2. Promotion
- Media
- Co-workers
- Physicians
- Supporting Evidence
- Consultants

3. Cause Identification (Group Solves the Problem)
- Specific Location
- Distinct Activity
- Single Agent

4. Spread
- More Occupants
- More Symptoms
- More Promoters
- More Causes Identified

5. Resolution
- Desirable
- Undesirable

Indoor Air Quality Model

Technical Evaluation	Risk Communication
20%	80%

Average Total Cost of Poor Risk Communication & Indoor Air Quality

(Katchen's guestimates from various experiences)

Stage	Cost
1.	~$10K
2.	~$50K
3.	~$100K
4.	~$500K
5.	>$1M

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AGENCY REPORTS ON CURRENT IAQ ACTIVITIES

American Lung Association of Los Angeles County (ALA-LAC)

– David Berger (bergerd@lalung.org) http://www.lalung.org/

State ALA. The ALA-California office held its annual conference last month. Prior to the conference, ALA-C conducted a workshop with the state affiliates on the Tools for Schools program. It appears that only a small number of affiliates are implementing TFS in any significant way; most of the affiliates with a TFS program are conducting training workshops.

IAQ TFS Program. The Lung Association agreed to continue with its IAQ TFS Mentor Program for a second year. The Lung Association received renewed commitment from the current mentors to participate. In addition, the Board of the So. Cal. AIHA met in July and agreed to continue support of the Tools for Schools program.

The Lung Association will change its focus and its outreach strategy based on resource constraints and lessons learned from the initial pilot year. Staff and volunteers will continue to make presentations about the program to interested networks and promote the mentor program through various media: website, press, and at conferences. However, ALA-LAC will not market the program to Los Angeles County school district staff in an unsolicited manner. That is, the Association will primarily respond to school requests for program information.

This past summer, because of the recent media attention to the issue of portable classrooms, there was a significant increase in parental interest in IAQ in the schools. This has generated greater interest in the TFS program on the part of school district staff and resulted in several school districts and school representatives recently contacting the Lung Association to participate in the Mentor Program.

KickAsthma LA. A collaborative partnership between the American Lung Association of Los Angeles County, the City of Los Angeles' Environmental Affairs Office and Mothers of East L.A to Keep Improving Control of Kids' Asthma (K.I.C.K. Asthma L.A.) by addressing pediatric asthma and environmental contaminants. As part of the program, ALA-LAC is planning a Family Asthma Awareness Day, Oct. 23 at the El Sereno Recreation Center.

The Program Manager resigned to attend medical school and ALA-LAC is currently searching for a replacement, contact Johanna Goldberg at (323) 935-5864 for more info.

Asthma Management Conference for Primary Care Physicians. The Lung Association is sponsoring a conference, Oct. 9 at the Autry Museum, to provide education and information on asthma management for primary care physicians. Rick Barbers from USC School of Medicine along with several other researchers will present. There is no charge for this conference, however, to reserve contact ALA-LAC at (323) 935-5864, ext. 250.

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California Air Resources Board / Indoor Air Quality & Personal Exposure Assessment Program

– Peggy Jenkins (*mjenkins@arb.ca.gov*)
http://www.arb.ca.gov/research/indoor/indoor.htm

New PM Project. ARB Indoor Program staff and researchers from Harvard University, US EPA, and Integrated Environmental Services participated in a kick off meeting for an ARB-funded research project entitled "Characterization of the Composition of Personal, Indoor, and Outdoor Particle Exposures". This ARB project provides co-funding to the Los Angeles portion of a major US EPA national particle exposure study. Los Angeles is one of three cities to be included in the EPA study. This project will characterize the personal exposures of 15 individuals with chronic obstructive pulmonary disease to fine particles and a number of gaseous pollutants. ARB's portion will focus on characterizing the chemical composition of personal, indoor, and outdoor fine particles and examining the relationship between personal exposures and indoor and outdoor concentrations for each of the major fine particle components. The field work is anticipated to begin early next year. Results from this project will improve our understanding of the impact of both indoor and outdoor particles on personal exposures and health effects.

CPIEM Update. In mid-June, ARB staff met with ICF/SAI staff to kick off a research project entitled, *Update and Refinement of the California Population Indoor Exposure Assessment Model (CPIEM)*. ICF/SAI will: (1) identify, acquire, and incorporate new data into CPIEM for use in the estimation of inhalation exposures and indoor pollutant concentrations; (2) improve the efficiency and ease of use of the model by incorporating calculations that are currently performed outside of the core module, and by transferring the core software from a DOS to a Windows environment; and (3) refine the estimation of exposure based on new information available, and develop algorithms for estimating uncertainty and the net removal of pollutants indoors. The work is scheduled for completion in the fall of 2001.

Development of Realtime Monitors. Projects to develop real-time indoor monitors for ozone and nitrogen dioxide are nearing completion. The prototypes of both monitors have been developed and lab tested, and both have proven to be reasonably successful in the initial field tests. Further field testing and use in near-term ARB field studies is planned.

In-Vehicle Study. In the past few months, results of our study entitled "Measuring Concentrations of Selected Air Pollutants inside California Vehicles" have been highlighted in many national and local news reports. The news generated much public interest regarding personal exposures to air pollutants while driving. The major finding of the study was that pollutant levels inside cars driven on freeways and arterials were usually several times higher than levels measured concurrently at the nearest ambient monitoring stations. Additionally, the investigators found that fine particles from nearby diesel-fueled vehicles enter the car rapidly, even with windows up and the air vents closed. This apparently is due, in part, to the high air exchange rates of moving vehicles. ARB staff are continuing to analyze the extensive real-time particle and black soot data collected in the study. So far, more than 200 copies of the final study report have been sent to interested parties.

Legislative Bill Analyses. ARB staff analyzed a number of legislative bills over the summer, including SB 25 (Escutia), and AB1207 (Shelly). SB 25 would require ARB and OEHHA to review ambient air quality standards and toxic air contaminant regulations to determine whether they are sufficiently protective of children's health, and to revise those that may need revision within a specified timetable. If approved, SB25 would entail an intense effort by ARB and OEHHA. AB1207 includes various provisions related to assuring healthy schools, including restrictions on pesticide use in schools, a requirement for DHS to develop an instruction manual and provide training to school personnel on best management practices for assuring good indoor environmental quality in schools, and a requirement for DHS and ARB to conduct a study of portable classrooms.

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California Department of Health Service / Environmental Health Investigations Branch

– Sandra McNeel (SMcNeel@dhs.ca.gov)

Reminder. The folks at EHIB are finally on a new server. The new domain is @dhs.ca.gov, and most user names are the same as the old PROFS.

School IAQ & Health Consultation. During the last week of June 1999, Los Angeles County Department of Health Services and administrators of the Saugus Union School District requested assistance in evaluating alleged toxic indoor air contaminants in 2 classrooms. A local MD specializing in medical toxicology had identified allegedly "toxic" levels of arsenic, phenol and formic acid in some students and teachers. This physician also alleged that several of the students and teachers had "toxic" levels of *Stachybotrys chartarum* identified in their blood.

Staff from EHIB and IAQS responded by reviewing accessible medical records of children and teachers from these rooms and examining environmental sampling results performed over the previous 6 months by an environmental consultant hired by the school district. DHS staff also performed a walk-through inspection of the two index classrooms.

Review of the 19 medical records made available to EHIB staff found a variety of non-specific symptoms, including headaches, stomachaches, recurrent sinus infections, ear infections, sore throats, fatigue, restless legs and inability to concentrate. Environmental sampling included air sampling for VOC's (especially formaldehyde), arsenic, arsine gas, benzene, carbon monoxide and phenol. Microbiological sampling was also conducted, including culturable and non-culturable techniques for air, wipe and bulk samples.

Review of all environmental data identified ventilation problems in some classrooms (the school district had all classroom HVAC systems examined), and some siting issues involving portable classrooms. Indoor formaldehyde levels were 18-26 ppb (outdoors as 5-6 ppb). These levels are consistent with other indoor environments such as California homes. No sources of arsenic were found in air, soil (<3.7 ppm) or water (<5ppb).

Review of available medical records identified use of a number of non-standard medical tests. Tests for formic acid and phenol were found to be invalid as indicators of exposure to formaldehyde and benzene, respectively. Some of the tests were also interpreted inaccurately.

DHS staff concluded that there was not evidence of toxic exposure to VOC's or molds in the classrooms studied. Recommendations were made for community input into environmental safety concerns, including use of US EPA Tools for Schools, which the district has implemented. The complete text of the health consultation is available at http://www.saugus.k12.ca.us

Bill Analyses. Debra Gilliss has been extensively involved with reviewing and analyzing several bills currently in the legislature that involve schools and environmental quality issues. These include AB 1207 (Shelly), SB 993 (Hayden), SB 162 (Escutia), AB 387 (Wildman) and AB 137 (Firebaugh). Julie Von Behren has analyzed SB 1111 (Sher), a bill charging DHS to develop an asthma surveillance, prevention and control program.

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California Department of Health Service / Indoor Air Quality Section

– Jed Waldman (waldman@cal-iaq.org) http://www.cal-iaq.org

On-line IAQ Firms List. The DHS *Listing of Consultants Offering IAQ Services in California* (July 1999 Update) is now available on-line at http://www.cal-iaq.org/FIRMS/. It includes a section on how to use this list, a Contact-Info only listing by area code, and the Full Listing in PDF format. Also included on the site are three pages on Guidance for Hiring IAQ Consultants, including *Guidelines For Selecting An Indoor Air Quality Consultant* (modified from Operation Outreach, American Industrial Hygiene Association); *Hiring Professional Assistance to Solve an IAQ Problem* (modified from Building Air Quality: A Guide for Building Owners and Facility Managers); and *Hiring Professional Assistance* (modified from Indoor Air Quality Tools for Schools: IAQ Coordinator's Guide). A Registration Form is also available for firms which would like to be added to the List.

Sierra Region Radon Survey. A radon survey in Sierra region will be started this fall. A recruiting letters is being sent out this month. Funding is being provided by U.S. EPA State Indoor Radon Grant, and IAQS is working with the DHS Radon Program.

Unvented Gas Heater - Standards Development. The contractor report by Greg Traynor, *Evaluation of Technical Literature, Indoor Air Pollution Modeling, Options For California Standards, and Recommended Standards*, has been finalized . This report includes revisions to the earlier draft, submitted comments and responses, revisions to the Proposed Standards, as well as comments and responses to these. The report is available on-line at www.cal-iaq.org/SB798/. A *Staff Position Paper* is being prepared, and the SB798 Implementation Advisory Group will next meet in Berkeley on October 12, 1999 (2 pm).

Studies of Building Materials and VOC Emissions: We have completed assembling and testing our two mini-chambers and have started scanning various building materials which will be used at the Richmond Lab Facility. The student assistant will help us part-time during the school year.

The full-size chamber is operational and is currently being used by the Outdoor Air Section to conduct a HUD-funded lead dust study.

Capitol East End Project: We will be participating in the review of the proposals submitted by the designer/builders next month. Three proposals will be received for each of the two east end projects. In addition, we have been working with DGS, CIWMB, and CEC to develop a tiered approach on green building issues that DGS can apply in new construction. This effort is on-going. See the notes under Building Design and Operations Committee

BASE Study. Janet and Kai-Shen have been assisting EPA's Indoor Division on data analysis and interpretation of the Building Assessment Survey and Evaluation (BASE) Study.

Funding from Tobacco Related Disease Research Program (TRDRP). Leon Alevantis is PI on a three-year grant from TRDRP to study the parameters affecting leakage of air from designated smoking rooms. A large portion of this study will be conducted under controlled chamber conditions, and experiments are scheduled to start in December. Staff of LBNL's Indoor Environment Division are major collaborators.

Jed Waldman is working with Marty Kharazzi on another TRDRP-funded grant, *Ascertainment of Environmental Exposure during Pregnancy*. This study will employ collection of blood or urine specimens from over 60,000 expectant women in San Diego county.

Research Project on Children's Health. The CHAMACOS office is up and running (Center for the Health Assessment of Mothers And Children Of Salinas: a study of neonate growth, including respiratory development and asthma; focus on pesticide exposure and aeroallergens). A Burkard sampler has been installed at Natividad Hospital and will begin collecting pollen and spore data for the region soon.

New Research Proposal. Janet Macher is working with Profs. Ira Tager and Kathy Hammond on a proposal to CARB to study the effects of air pollution and aeroallergens in asthmatic children in the Fresno area. The intensive study will overlap with the Supersite study in the region. Similar ambient and home measurements of allergen exposures are planned. We also will explore the roles of airborne endotoxin (and possibly latex).

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California Department of Health Service / Occupational Health Branch

– Jim Cone (Jcone@ohb.org) and Liz Katz (Ekatz@dhs.ca.gov) http://www.ohb.gov

Y2K Info. Information for Y2K and Workplace Safety is available on the HESIS web site at http://www.ohb.org/Y2K.htm. The site identified key concerns for workplace safety in companies of all sizes, and it includes links containing information about embedded systems or related regulatory issues.

Cleaning Chemicals and Symptomatic Jail Employees. HESIS provided technical assistance to a Sheriff's Department regarding an indoor air quality incident that involved household bleach and a phosphoric-acid containing cleaning product. 41 injuries were reported.

Diesel Exhaust. HESIS provided information to a firefighters' association regarding the health risks of exposure to diesel exhaust, and on NIOSH and CDC recommended control strategies to reduce exposure.

Occupational Tuberculosis. HESIS provided assistance to a labor union official inquiring about the level of TB infection among Corrections employees.

Carbon monoxide. Assisted an employer in determining that symptoms of lightheadedness, nausea and headaches experienced by two typists was probably related to CO in the workplace. Recommended immediate interventions.

Portable Classrooms. HESIS participated with other DHS staff in a community meeting and walk-throughs related to portable classrooms at Saugus Union School District.

School Indoor IAQ Presentation. HESIS presented a case study illustrating occupational health problems that result from poor indoor air quality at schools for a brown bag hosted by CPHA-N Occupational and Environmental Health Committee.

Artificial Fog in Theatre Work. HESIS is currently conducting a study of symptoms in theatre workers exposed to various types of artificial theatrical fog. The study was initiated via employee complaints.

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California Department of Health Service / Tobacco Control Section

– Paul Hunting (Phunting@dhs.ca.gov)

Meeting on Secondhand Smoke Exposures. The DHS Tobacco Control Section hosted a meeting in San Diego on Sept. 23-24, 1999 discussing issues related to secondhand smoke and exposure in areas not previously covered by the Labor Code. Presentations were made by community health professionals from throughout California conducting work to reduce secondhand smoke exposure in hotels, public housing, apartments, and outdoor areas. Jennifer Jinot of the U.S. EPA provided updates on the latest research regarding childhood exposure to secondhand smoke. Special sessions were also held featuring presentations by both the Attorney General Bill Lockyer and the Department Director, Dr. Diana Bontá.

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California Department of Industrial Relations (Cal/OSHA)

– Jim Lim (Jlim@hq.dir.ca.gov) http://www.dir.ca.gov/DIR/OS&H/DOSH/dosh1.html

Appointment of New Deputy Chiefs. Vicky Heza has been appointed as acting deputy chief for field operations and Len Welsh as acting deputy chief for health and technical services for the Division of Occupational Health and Safety effective September 1, 1999. John Howard continues as acting chief of the Division.

Asbestos Training Approval Program. The Division has hired two new Associate Industrial Hygienists and a new clerk to implement a program to approve asbestos training based on regulations that became effective on January 2, 1999. The new program will approve AHERA and other asbestos training courses which are required in existing Cal OSHA Title 8 regulations. The program will also establish and maintain a roster listing trained individuals validated by the Division. The aim of the new program is to assure high quality trained individuals for working with asbestos, and to eliminate fraudulent asbestos training certificates which are presently in use. This new program is presently operational and is receiving requests from training providers for approval of their asbestos training courses. The program will be entirely supported by fees that will be collected by the program.

Airborne Contaminants 8 CCR 5155. After completing a series of ad hoc advisory committee meetings on the subject, the Division has completed a proposal to update the PELs of 8 CCR 5155. The proposal has been transmitted to the Standards Board for their consideration and adoption.

Development of A Heat Stress Standard. The Division has taken preliminary steps toward the development of a much needed heat stress standard. The Division is presently gathering data on the subject, and will be assembling an ad hoc advisory committee to assist in developing a proposed standard.

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Lawrence Berkeley National Laboratory / Indoor Environments Program

– Joan Daisey (JMDaisey@lbl.gov) http://eetd.lbl.gov/iep/iep.html

The following is a listing of papers presented at the ***Indoor Air '99*** conference in Edinburgh, by investigators in the LBNL Indoor Environment Program and the UC Berkeley Department of Civil and Environmental Engineering. The conference proceedings include an abstract and the six-page manuscripts for each paper. For more information on the conference and how to obtain proceedings, refer to http://www.ia99.org/index.html.

- *VOCs and Sick Building Syndrome: Application of a New Statistical Technique to U.S. EPA BASE Study Data,* MG Apte and JM Daisey.
- *Ventilation efficiency of desk-mounted task air-conditioning systems,* D Faulkner, WJ Fisk, DP Sullivan, and DP Wyon.
- *Particle concentrations and sizes with normal and high efficiency air filtration in a sealed air-conditioned office building,* WJ Fisk, D Faulkner, DP Sullivan, and M Mendell.

- *Sources & Concentrations of Formaldehyde and Volatile Organic Compounds in New Manufactured Houses,* AT Hodgson, D Beal and S Chandra.
- *Techniques for Reducing Exposures to Volatile Organic Compounds Following New Construction and Renovation,* AT Hodgson and DA Shimer.
- *Indoor Air Quality, Ventilation and Health Symptoms in Schools: An Analysis of Existing Information,* JM Daisey and WJ Angell.
- *Emissions of odorous oxidized compounds from carpet after ozone exposure*, GC Morrison and WW Nazaroff.
- *Reducing Uncertainties in Quantifying Source/Exposure Relationships for Particulate Matter: An Iterative Approach Based on Measurements and Models,* TE McKone.
- *Dynamic Behavior of Polycyclic Aromatic Hydrocarbons in Environmental Tobacco Smoke: Effects of Aging and Temperature Variation on Phase and Size Distributions,* LA Gundel, KRR Mahanama, SV Hering, MD Van Loy and JM Daisey.
- *Indoor Transport of ETS Particles and Tracers,* MG Apte, LA Gundel, BC Singer, DP Sullivan and RG Sextro.
- *Characterizing ETS Emissions from Cigars: Chamber Measurements of Nicotine, Particle Mass, and Particle Size*, NE Klepeis, MG Apte, LA Gundel, WW Nazaroff, and RG Sextro.
- *Modeling particle penetration through cracks in building envelopes*, D-L Liu and WW Nazaroff.
- *Modeling aerosol behavior in multi-zone indoor environments,* MD Sohn, A Lai, BV Smith, RG Sextro, HE Feustel, WW Nazaroff.
- *Inhalation transfer factors for assessing human health risks from air pollutant sources,* ACK Lai, TL Thatcher and WW Nazaroff.
- *Particle deposition from turbulent duct flow,* MR Sippola, WW Nazaroff and TL Thatcher.
- *Comparison of modeled and measured tracer gas concentrations in a multi-zone building*, RG. Sextro, JM Daisey, HE Feustel, DJ Dickerhoff, and C Stetiu.
- *Determining transfer factors for outdoor aerosol plumes entering buildings*, TL Thatcher, WW Nazaroff and RG Sextro.
- *Characterizing indoor airflow and pollutant transport using simulation modeling for proto-typical buildings. I. Office buildings*, MD Sohn, JM Daisey, and HE Feustel.
- *Advances in algorithms for mapping indoor gas concentrations using optical remote sensed data,* PN Price, ML Fischer, EU Finlayson, K-H Hong, CA Schwalbe, AJ Gadgil.
- *Measuring dispersion of gases in a large scale indoor environment using an open-path tunable diode laser,* TL Thatcher, ML Fischer, PN Price, WJ Fisk, AJ Gadgil, RG Sextro.
- *Commercial CFD software capabilities for modeling burst release of a pollutant in large indoor spaces,* AJ Gadgil, K-H Hong, EU Finlayson, RG Sextro.

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Office of Environmental Health Hazard Assessment / Indoor Air Risk Assessment Group

– Richard Lam (*Berkeley.RLam@hw1.cahwnet.gov*) http://www.oehha.org/

Bill Analyses. A number of legislative bills were analyzed on their impact on OEHHA. These included bills which require changes to the way new or existing school sites are evaluated for hazardous substances (AB 137, SB 162, AB 387, and SB 993), the Healthy Schools Act of 1999 (AB 1207), Children's Health Bill (SB 25), and MTBE (SB 989) .These bills are currently on the Governor's desk.

Documents on the Web. The following documents are available for downloading from OEHHA's website (http://www.oehha.org/scientific/other.html)
a. Toxic Directory (1999). This directory lists agencies and organizations that can provide information about or have authority over toxic substances and their health effects. The organizations range from local to national, with special emphasis on California-based resources.
b. Air Toxic Hot Spots Risk Assessment Guidelines
Part I: Technical Support Document for The Determination of Acute Reference Exposure Levels for Airborne Toxicants (4/5/99)
Part II: Technical Support Document for Describing Available Cancer Potency Factors (4/30/99)
c. Notice to interested parties notice of public comment period on Cancer Potency Assessment of MTBE (9/12/99)

Risk Assessment for Phosgene Exposures at Prison. We were asked to provide a risk assessment from sampling results done on a prison in California. Sampling results from a contract company shows the presence of phosgene in the exhaust stack of the license plate drying oven. Levels ranged from 2.3-3.2 $\mu g/m^3$. The levels measured were low and is below OEHHA's acute REL of 4 $\mu g/m^3$. Prison personnel have experienced health related symptoms for many years and they included headaches, vomiting, weakness, tickling of the lungs, dryness of the mucous membranes, nausea, slurred speech and skin rashes. Although, measurements done previously indicated the presence of different kinds of VOCs, this is the first time phosgene was reported to be present in the exhaust from the stack.

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San Bernardino County Superintendent of Schools Office / Southern California Schools Risk Management

– Ken Dudash (Kenneth_dudash@sbcss.k12.ca.us)

Generic School District Indoor Environmental Quality Action Plan. To assist school districts to prepare for IEQ problems and to develop a pro-active program, staff prepared a generic document for schools to build upon. The document includes sections on Purpose, Response Action Plan, and Management Action Plan. For a copy, contact Ken Dudash.

Draft Guidelines for Teachers. Staff also prepared a list of IAQ guidelines, in response to a district request. These generic guidelines are being made available to other districts:

- Report indoor air (IAQ) quality problems and/or concerns to the school principal. The school principal will contact _____School District's IAQ coordinator _____at (___)_____.
- Maintain continuous operation of heating, ventilation and air conditioning (HVAC) system during regular school hours. Do Not Turn Unit Off!
- Follow all directions posted near thermostat controls. Failure to follow these directions may result in reduced IAQ and/or damage to the building HVAC system.
- Classrooms are to be kept free of clutter that restricts custodial access. Poor housekeeping and restricted access will reduce cleaning efficiency and result in reduced IAQ.
- Supplies, equipment and other materials are to be kept clear of HVAC supply and return air-vents.
- All cleaning materials and other products requiring Material Safety Data Sheets (MSDSs) must be properly stored. Appropriate storage must also restrict access by children in grades K through 8.
- Only appropriately trained persons (Hazard Communication) may use products which require MSDSs. Inappropriate use of these products may result in reduced IAQ and other safety and health concerns.
- Food storage in classrooms is discouraged. Inappropriate food storage and inadequate cleanup can result in increased appearance of pests and reduced IAQ.
- Pesticides are not to be stored in classrooms. The _____School District's Integrated Pest Management (IPM) Program prohibits the use of spray-applied pesticides in classroom unless absolutely necessary. Only appropriately trained persons may use pesticides (as per Cal-OSHA and Department of Pesticide Regulation requirements).
- Report roof leaks, or other situations regarding water-damaged materials, to the school principal. The school principal will contact the maintenance department in an attempt to resolve these issues within 24-hours.

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Stanford University

– Wayne Ott (wayne@stat.stanford.edu)

Staff contributed three technical presentations at the August 1999 annual meeting of the International Society of Exposure Analysis (ISEA) in Athens, Greece, under a grant with U.S. EPA and the Lawrence Berkeley National Laboratory.

Particulate Matter Concentrations in Non-Residential Microenvironments: a Review, by MJ Zufall, H Ozkaynak, M Brauer, WR Ott, and JH Spengler, reviewed the existing fine particle data (PM-2.5 and PM-10) for locations other than the residential environment, such as motor vehicles, offices, schools, stores, libraries, museums, homes for the elderly, bars, and restaurants. In these locations, the strongest contributions to fine particle concentrations usually were from smoking, followed by cooking, followed by the physical activity of people. Although some types of sources and microenvironments were fairly well characterized, such as environmental tobacco smoke in restaurants, there is need for more measurements in microenvironments that have not been adequately studied, such as day care centers, schools, recreation centers, etc.

Clothes as a Source of Particles Contributing to the 'Personal Cloud, by LA Wallace, WR Ott, C Howard-Reed, V Zartarian, and L La Rosa, examined the contribution that resuspension from clothing makes to the "personal cloud." The personal cloud is the reported tendency for a personal monitor worn by an individual to give higher concentration readings than either the nearby indoor monitor or the outdoor ambient monitor. It describes a yet unsolved gap between indoor air quality and personal exposure. One hypothesis for the personal cloud is that the close proximity of the person to indoor sources causes elevated exposures, which has been studied and modeled set of Stanford proximity experiments with 39 monitors. This paper examined a different personal cloud hypothesis -- that the clothing worn by the person causes particles to be resuspended, thereby causing higher concentrations at the intake of the personal monitor. This study used laser counters, optical scattering devices, and the aerodynamic particle sizer to measure particle concentrations in real time. The activities investigated included "flailing" (waving arms); patting clothes; turning sweaters inside out; wearing clean vs. dirty clothes; sitting, standing, walking, and stomping; and "tossing and turning" in bed. Extremely large particle concentration readings were observed for common everyday activities in the home, such as fluffing pillows, turning over in bed, and turning sweaters inside and out. The results suggest that the contribution to exposure from clothing is from airborne dust settling on clothes and being shaken off -- not the fibers from the clothes themselves.

Air Exchange Rate Measurements in Two Residences: The Impact of Opening Windows, by C Howard-Reed, LA Wallace, and WR Ott, reports the results of over 300 air exchange rate measurements at two different homes, one in California and one in Virginia. One home is a two-story detached house in Redwood City, CA, and the other home is three-story town home in Reston, VA. Measurements were made after controlled releases of sulfur hexafluoride (SF6) using a *Bruel & Kjaer* photoacoustic infrared spectroscopic monitor. For each house, a power law was found for the relationship between open a single window to specific widths and air exchange rate. As part of this analysis, a three compartment indoor model was applied to the three levels of the Virginia town home and a single compartment model to the California home. Opening a window from 1" to 5" to 10" to multiple windows was found to increase the air exchange rate from 0.2 air changes per hour (ach) to nearly 1 ach, or nearly an order of magnitude. Of all the factors affecting the air exchange rate of a home, the window position was found to be the most important, with a significant change occurring when a single window is opened a few inches, compared with all windows and doors tightly closed. These findings have implications for collecting data on homes in future exposure and indoor air filed surveys and for applying indoor air and exposure models to residential settings.

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U.S. EPA Region IX / Indoor Environment Team

– Barbara Spark (*spark.barbara@epamail.epa.gov*)

http://www.epa.gov/oar/oria_ied.html

Indoor Air'99. Barbara Spark attended Indoor Air 99, the 8th International Conference on Indoor Air Quality and Climate, in Edinburgh, Scotland in August (self-funded), and participated actively in a workshop on mycotoxins and health effects. The bioaerosols track at this conference was a little diffuse, and in general, the conference would have benefitted from greater time being given over to discussion among the participants. [These lessons will be addressed at the next international IAQ conference, "Healthy Buildings 2000," to be held in Finland (information: http://www.hb2000.org), which will have a pre-conference satellite "Saratoga Springs 1998 (third international conference on fungi, mycotoxins and bioaerosols Follow-up Meeting," and where the main body of the conference will feature interactive workshops.]

In big news locally, the next ISIAQ Conference (held every three years) -- Indoor Air 2002 will be very much a "California event," taking place in Monterey, California under the stewardship of Hal Levin (Conference President), with a superb organizing committee which includes Bill Nazaroff and Kirk Smith of UC Berkeley, Joan Daisey, Bill Fisk and Rich Sextro of LBNL, and Jed Waldman of CA DHS. The web page for the conference is http://www.indoorair2002.org

Mold Conference Proceedings Due. Speaking of the September 1998 Saratoga Springs mold conference, it's expected that proceedings will be available soon. Those wishing direct notification should send an e-mail request to Chris Grosse at the East NY Occupational Medical Center: grossec@crisny.org

Tools for Schools Training at ALA Meeting. IAQ Tools for Schools: Shelly Rosenblum was a presenter at the August 25 "IAQ Tools for Schools" training workshop attached to the statewide meeting of the American Lung Association (see ALA/LAC notes, David Berger).

IAQ Tools for Schools. We continue to move forward with pilot implementation programs in the San Francisco and Oakland Unified School districts (see June minutes), and have held meetings with district upper management to smooth the way. To repeat an important theme, interested "pilot schools" have been promised Mentors. CIWG-IAQ members are once again invited to consider volunteering to mentor a school site for this breakthrough program. (Contacts: Shelly Rosenblum (415) 744-1047, rosenblum.shelly@epa.gov; Barbara Spark (415) 744-1132 spark.barbara@epa.gov , Louise Hill (415) 744-1046 hill.louise@epa.gov .

IAQ in Schools *Hot Spots*. We've been intensely involved in providing technical support to two school districts which had been in the "hot seat" in terms of community concerns about alleged health threats in portable classrooms. July 19-21, Barbara and Shelly provided three training workshops, visited school sites, and participated in two fairly dramatic 4+ hour evening public meetings with concerned parents. Two of the workshops were attended by risk and facilities managers from a variety of school districts in the East San Gabriel and Santa Clarita Valleys - districts whose interested had been "piqued" by the ripple effect from recent

media coverage school IAQ. A complete "train-the-coordinator" workshop was provided for newly appointed IAQ Coordinators at all 12 schools in the Saugus Union SD), where management support for this program has been extremely gratifying. Documents relating to IAQ activities at Saugus Union can be accessed at their web page: http://www.saugus.k12.ca.us/environ/env2.htm "Hot spot" ripple effects also led to our providing a presentation on the IAQ TFS to a statewide Loss Control meeting of Keenan and Associates, a major insurer of school districts.

IAQ Tools for Schools Mentor Program. Due to budget constraints, we've been able to provide only a very small grant to ALA of Los Angeles County to assist their continuing administration of the ALA/AIHA TFS "Mentor" program. This is particularly dismaying at this time, since it's anticipated that recent media coverage will greatly diminish the primary barrier their program faced in its pilot year: that is, the difficulty in recruiting schools which David Berger described in the June CIWG-IAQ minutes.

C.A.S.H. School IAQ Workshops. The Maintenance Network of the Coalition for Adequate School Housing (C.A.S.H.) sponsored half-day workshops on school IAQ in late July, in Sacramento and Ontario. Barbara Spark spoke on the TFS Action Kit program at both, and covered for Jed Waldman on CIWG-IAQ and the "Critical Needs" document at the Ontario program. Representatives of the portable classroom industry also presented their perspective, which included a reported lack of interest and/or ability by school districts to purchase more costly, higher-quality portables.

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WORKING GROUP COMMITTEES

Indoor Environmental Quality of Schools

– Jed Waldman (waldman@cal-iaq.org)

Committee Report Status. Comments on the committee's report were sent to DHS by departmental staff at ARB, CDE, CEC, DGS, DHCD and OEHHA. The report has been updated (August 1999) and retitled, *Indoor Environmental Quality in California Schools: An Assessment of Needs and Opportunities*. It has been submitted to DHS management for approval to be released.

Assembly Bill 1207. An amended version of Assembly Bill (AB) 1207 was passed in the final days of the 1999 legislative session, and it is currently on the Governor's Desk awaiting his signature. The enrolled bill language can be found on the California LegInfo web site under "Bill Information" (http://www.leginfo.ca.gov/).

Building Design and Operations

– Leon Alevantis (*lalevant*@cal-iaq.org)

Capitol East End Project.

East End Project: Based on the submitted RFQs, three designer/builders have been selected and invited to submit RFPs by early October. The Green Building/Technical Committee consisting of representatives from CIWMB, CEC, CARB, and DHS will be reviewing the submitted RFPs and will providing input to DGS and to the selection committee. The selection committee will make its final selections in December.

Energy Efficiency and Green Building Measures: We have been working with DGS, CIWMB, and CEC to develop a two-tiered approach on energy efficiency and green building measures which DGS can apply in new construction. The various measures will be based on the size and application of each building project. Tier 1 will consist of demonstrated cost-effective measures in all projects, whereas, Tier 2 will consist of measures which will need to be demonstrated in each project as being cost effective. Obviously the DOF will need to agree to this approach.

SB280: The Bill has been placed on hold at the request of Senator Bowen. It will be reconsidered during the next legislative session next year. Senator Bowen requested this because Governor Davis is opposing the present language of the bill. A version proposed by the governor's office puts DGS in charge of the implementation of the Bill and gives the existing working group of representatives from CIWMB, CEC, CARB, and DHS an oversight role. The governor's version of the bill was primarily written by DGS although it had some limited input from CIWMB. CEC was asked to provide input but their modifications were not added to the final language. Finally, neither CARB or DHS were asked to provide input to the governor's proposed language.

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FUTURE MEETINGS

Upcoming meetings of the CIWG-IAQ are scheduled as follows:

- December 8, 1999, DHS Laboratory, 2151 Berkeley Way, Berkeley
- March 8, 2000, CARB Headquarters, 2020 L Street, Sacramento
- June 7, 2000, TBA
- September 13, 2000, TBA

MEMBERS PRESENT/AFFILIATIONS

Leon Alevantis (*)	CA DHS IAQ Program
Ken Dudash	San Bernardino County Superintendent of Schools Office
Arlene Feingold	IH Consultant, Los Angeles
Andrea Hricko	Southern California Environmental Health Science Center
Steve Hui (*)	CARB IAQPE Program
Peggy Jenkins	CARB IAQPE Program
Michael Kleinman	UC Irvine Dept. Community & Environmental Medicine
Rebecca Lally	UC Irvine Environ. Health & Safety
Richard Lam (*)	OEHHA ATES
Cole Landowski	LA Co. Dept. of Health Services - Occupational Health
Jim Lim	Cal/OSHA Standards
Susan Lum (*)	CARB IAQPE Program
Phil Maynard (*)	UC Berkeley Environ. Health & Safety
Rob McConnell	University of Southern California
Jeff Neeland	CA Dept General Services - Building & Property Management
Tom Phillips (*)	CARB IAQPE Program
Gary Pons	LA Unified School District
Stuart Salot	CTL Environmental Services
Alvin Samala	UC Irvine Environ. Health & Safety
Dorothy Shimer (*)	CARB IAQPE Program
Norm Sorensen	CA Dept. Housing & Community Development
Barbara Spark	U.S. EPA Region IX
Scott Trimingham	Indoor Air Project
Vicki Uchida	Alliance of Schools for Cooperative Insurance Programs
Jed Waldman	CA DHS IAQ Program

(*) attended by phone.

Jed Waldman chaired the meeting, which lasted from 10 am to 12:30 pm

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